

## *CANopen DC servo drive for underwater vehicles*

**Ingenia (Spain) has developed the i146 servo drive, which meets requirements of the marine and subsea market. It has been designed for BLDC servo motor controls on thrusters and electric propulsion systems on board of subsea vehicles such as manned submersibles, AUVs, or ROVs.**

THE DEVICE DELIVERS UP TO 12 kW CONTINUOUS POWER operating with a voltage range between 180 V<sub>DC</sub> to 300 V<sub>DC</sub>. It has been designed as an integral part of a complete underwater propulsion module. One of its features is a four quadrants non-simultaneous insulated-gate bipolar transistor (IGBT) commutation algorithm, which helps to minimize both switching losses and EMIs. This power stage scheme together with IGBT modules allows to achieve an overall efficiency of more than 98 %.

The product complies with the CiA 301 and CiA 402 communication profile. It also features a CAN isolated interface, which means there is no need for a external power supply.

The PWM frequency is greater than 16 kHz, avoiding in this way to generate audible noise. The driver operates with a single battery supply for power and logic, which includes a controlled capacitor pre-charge and allows regenerative braking. It uses digital hall sensors for both servo motor commutation and velocity feedback loop, avoiding using external feedback devices. Hall sensor inputs allow operation even when feedback and power cables need to be wired closely in hermetic subsea connectors.

This product for subsea operations incorporates power stage, control blocks, communications and I/O boards in a single PCB. Each electronic section has been designed for ruggedness and performance in subsea operation conditions. To minimize EMI and safety issues, the different sections (power, control, feedbacks and I/O) are fully isolated.